

ORIGINAL ARTICLE

The Comparison of Gender Dysphoria, Body Image Satisfaction and Quality of Life Between Treatment-Naive Transgender Males With and Without Polycystic Ovary Syndrome

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Abstract

The prevalence of polycystic ovary syndrome (PCOS) among trans men has been reported as higher than among the cisgender population, which varies between 14.4% and 58%. In this cross-sectional study, we aimed to evaluate the association of oligo-anovulation and/or features of hyperandrogenism with the scores on the Utrecht Gender Dysphoria Scale (UGDS), the Body Image Scale (BIS), and the Short Form-36 Health Survey (SF-36) in treatment-naive trans men with PCOS seeking help for gender transition. The study sample consisted of trans men who were diagnosed with gender dysphoria (GD) between December 2019 and November 2020. To assess body dissatisfaction and psychological functioning, the UGDS, BIS, and SF-36 were administered to all transgender individuals as part of the routine assessment procedure. A total of 49 treatment-naive trans men were included in our study; 38.8% ($n=19$) of the participants were diagnosed with PCOS using the Rotterdam 2003 criteria. The scores of UGDS and BIS were significantly lower in the PCOS group compared with the non-PCOS group ($p<0.001$ and $p=0.003$, respectively). Among the eight parameters within SF-36, general health, emotional role, and vitality scores were significantly higher in the PCOS group ($p=0.031$, $p=0.015$, and $p=0.006$, respectively). Our study is the first study that demonstrates significantly lower GD, higher body image satisfaction and quality of life in trans men with PCOS compared with those without PCOS. Our findings are promising for larger prospective cohort studies to develop a consensus on the management of PCOS in trans men.

Keywords: body image satisfaction; gender dysphoria; polycystic ovary syndrome; quality of life; trans men

Introduction

Gender dysphoria (GD) is defined as the incongruence between one's experienced/expressed gender and assigned gender, resulting in an impairment of psychosocial health.¹ Although the prevalence of GD in birth assigned females has been estimated as 265 in 100,000 people,² the true prevalence may be under-

estimated owing to variations in diagnosis, presentation, cultural acceptability, and associated stigma. To date, the etiology of GD is still unknown, whereas some biological factors have been mentioned as possible elements involved in the development of GD, that is, estrogen receptor α , steroid 5- α reductase 2, and steroid sulfatase alleles.^{3–5}

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Polycystic ovary syndrome (PCOS) is characterized by chronic anovulation, biochemical and/or phenotypic features of hyperandrogenism, and polycystic ovarian (PCO) appearance on ultrasound (US).⁶ PCOS is one of the most common endocrine disorders, with the prevalence of 4–21.27% among the general population using different diagnostic criteria.^{7–11}

In the majority of clinical studies, the prevalence of PCOS among trans men has been reported as higher than among the cisgender population (individuals whose gender identities match their sex assigned at birth) which varies between 14.4% and 91.7%.^{3,4,12–15} In contrast to these former studies, a recent review by Liu et al. has introduced no significantly different PCOS rates in trans men compared with a control group.¹⁶ Unfortunately, no physiological mechanism explaining the association of GD and PCOS has been reported to date.

In the literature, the presentation of PCOS has been subdivided into four phenotypes: Phenotype A: oligoanovulation + hyperandrogenism + PCO on US; Phenotype B: oligoanovulation + hyperandrogenism; Phenotype C: hyperandrogenism + PCO on US; and Phenotype D: oligoanovulation + PCO on US.¹⁷

In cis women, hyperandrogenism, which underlies three phenotypes of PCOS has been associated with a decrease in self-esteem and body satisfaction.¹⁸ Furthermore, in cis women with PCOS there is an increased incidence of depression.^{19,20} It is known that anxiety, depression, and poor body satisfaction are increased in transgender people who have not yet undergone gender affirmative treatment.²¹ We also know that body satisfaction, anxiety, and depression improve with androgen treatment in trans men.²² Therefore, it appears that the effects of hyperandrogenism on the experience of trans men may be desirable for this population.

In this cross-sectional study, we aimed to evaluate the association of oligo-anovulation and/or features of hyperandrogenism with the scores on the Utrecht Gender Dysphoria Scale (UGDS),²³ the Body Image Scale (BIS),²⁴ and the Short Form-36 Health Survey (SF-36)²⁵ in treatment-naïve trans men with PCOS seeking help for gender transition.

Methods

Participants

The study population consisted of 52 adult trans men who were admitted to the Gender Identity Clinic (GIC) at our institution between December 2019 and November 2020. After being diagnosed with GD by a psychiatrist according to the DSM-5 (*Diagnostic and*

Statistical Manual of Mental Disorders, 5 Edition),¹ these individuals were referred to the Endocrinology clinic for pre-treatment endocrine assessment. Personal and family histories of the individuals were taken during the initial admission by the same psychiatrist who made the diagnosis of GD.

The GIC at our institution has been a major referral center for transgender health care since 2004. It is a multidisciplinary clinic that includes physicians from our psychiatry, endocrinology, gynecology, urology, and plastic surgery clinics, and a voice specialist. Together they have been providing the assessment, diagnosis, and management of physical and mental health of transgender individuals using the recommendations of the World Professional Association for Transgender Health.

Clinical data collection

All participants were evaluated in the Endocrine Clinic using a detailed personal and family history, a baseline serum endocrine profile test, and a transabdominal pelvic US scan performed by the Department of Radiology. Transabdominal pelvic US is a routine procedure, which has been applied to all trans men in our clinic, to evaluate the basal ovarian morphology before initiating the gender-affirming hormone therapy. Our exclusion criteria were having a genetic androgen disorder ($n=1$), a pituitary disease ($n=0$), hyperprolactinemia ($n=0$), or any psychiatric morbidity such as significant psychiatric disorder ($n=0$), previous use of anxiolytics ($n=0$), previous use of antidepressants ($n=2$), or antipsychotic drugs ($n=0$).

The baseline hormone assessment included a complete blood count (in the morning), fasting plasma glucose (FPG), fasting plasma insulin (FPI), and other endocrine profile, including prolactin, luteinizing hormone, follicle-stimulating hormone, estradiol (E2), total testosterone, 17-hydroxyprogesterone (17-OHP), androstenedione, anti-Müllerian hormone, and dehydroepiandrosterone sulfate in participants with regular menstrual cycles, and were performed during the early follicular phase of their menstrual cycle. For those who had irregular periods or amenorrhea, the same laboratory parameters were performed at any time.

Insulin resistance was evaluated using the homeostasis model assessment of insulin resistance (HOMA-IR)²⁶ and was calculated as: $\text{FPG (mg/dL)} \times \text{FPI } (\mu\text{U/mL}) / 405$. To investigate the diagnosis of congenital adrenal hyperplasia, a high-dose (250 μg) adrenocorticotrophic hormone stimulation test was performed on those with elevated 17-OHP (between 2 and 15 ng/mL).²⁷ The

demographic characteristics, the medical histories of the participants, the anthropometric measurements such as height, weight, and body mass index (BMI), and both menstrual and hirsutism status, were noted. Chromosome analysis of the participants was not performed.

The diagnosis of PCO syndrome was made by an endocrinologist using the Rotterdam 2003 criteria, which include oligoovulation and/or anovulation, clinical and/or biochemical signs of hyperandrogenism, and PCO appearance on US.⁶ Participants with two of these three criteria were diagnosed with PCOS, in the absence of other diseases, which interfere with the menstrual cycle and endogenous androgen secretion such as hyperprolactinemia, primary or secondary hypogonadism, and congenital adrenal hyperplasia.

Oligoovulation and/or anovulation were defined as having amenorrhea during the previous year or menstrual cycles longer than 35 days and/or less than six cycles per year. Hirsutism was considered as the main clinical indicator of hyperandrogenism and was determined by a Ferriman–Gallwey score of 11 or higher.²⁸ Ferriman–Gallwey is a scale for hirsutism, which evaluates nine areas of the body, of which each area is scored from 1 to 4. Higher grades indicate more severe hirsutism.²⁹ Ultrasonographic PCO morphology was defined as harboring 20 or more follicles measuring 2–9 mm, or an ovarian volume $> 10 \text{ cm}^3$.¹⁷

Measures

To assess body dissatisfaction and psychological functioning, the following scales were used. Before referring to the other clinics, UGDS, BIS, and SF-36 were administered to all transgender individuals in the GIC as a part of the routine assessment procedure at the time of initial diagnosis of GD, which blinded both the individuals and the clinicians from the survey outcomes.

The Turkish version of SF-36 was validated by Koçyiğit et al., and the Turkish versions of UGDS and BIS were validated in a dissertation thesis of a psychiatrist at our institution who evaluated 86 Turkish transgender individuals.^{30,31} UGDS consists of 12 items categorized as “agree completely, agree somewhat, neutral, disagree somewhat, disagree completely.” The version of the questionnaire that has been developed for trans men, including questions such as, *I prefer to behave like a boy*, *I wish I had been born as a boy*, or *I hate having breasts* was used. Items 3 and 7–9 were scored from 1 to 5, whereas items 1, 2, 4–6, and 10–12 were scored from 5 to 1, which resulted in a sum score between 12 and 60. Higher scores present higher degrees of GD.²³

In the BIS, the satisfaction with 30 body characteristics was asked in a questionnaire in which the scoring was ranged from 1 (very satisfied) to 5 (very dissatisfied). The items include primary sex characteristics (clitoris, vagina, uterus, and ovaries), secondary sex characteristics (Adam’s apple, body hair, breasts, hip, appearance, muscle, facial hair, and voice), and non-sex-related body parts. A higher sum score indicates a higher level of body dissatisfaction.²⁴

SF-36 includes a total of 36 items yielding eight health-related quality-of-life parameters, that is, physical functioning (physical activity), physical role (problems with work or other daily activities as a result of physical health), emotional role (problems with work or other daily activities as a result of emotional problems), vitality (energy), mental health (feelings of nervousness and depression), social functioning (social activities), bodily pain (limitations owing to pain), and general health (personal health). Standard SF-36 scoring algorithms were used to score each section and the total scores varied between 0 (worst) and 100 (best) on the assumption that each question carries equal weight.²⁵ Lower scores indicate more disability.

Statistical analysis

All statistical analyses were performed using IBM SPSS for Windows version 20.0 (SPSS, Chicago, IL). The Shapiro–Wilk’s test was used to assess the assumption of normality. Continuous variables were presented depending on normal distribution with either mean $\pm$ standard deviation (SD) or (in case of no normal distribution) median (25th–75th percentile). Categorical variables were summarized as counts (percentages). Comparisons of continuous variables between groups were carried out using the independent samples *t*-test for parametric data (Age, HOMA-IR, UGDS, BIS, Physical Functioning, Physical Role, Emotional Role, Social Functioning, Bodily Pain, And General Health) and the Mann–Whitney *U*-test for nonparametric data (Vitality, Mental Health, and BMI).

All statistical analyses were carried out with 5% significance and a two-sided *p*-value < 0.05 was considered statistically significant. Ethics approval was obtained from the ethics committee of Kocaeli University, Faculty of Medicine (Date: 13.11.2019, No: KÜ GOKAEK 2019/19.34 - 2019/330) and written informed consent was acquired from each individual who participated in our study, after being asked to participate by the psychiatrist during their initial admission. Fortunately, no individual refused to participate in our study.

Table 1. Comparison of the Survey Scores, Demographic and Clinical Characteristics Between Two Groups

	PCOS (n = 49)		<i>p</i> ^a
	No (n = 30) Median (25th–75th)	Yes (n = 19) Median (25th–75th)	
Age	25.50 (23.50–29.00)	24.00 (23.00–30.00)	0.628
HOMA-IR	1.28 (0.98–2.35)	1.55 (1.00–1.84)	0.783
Utrecht Gender Dysphoria Scale	4.92 (4.75–5.00)	4.50 (4.33–4.67)	<0.001
Body Image Scale Short Form-36	3.77 (3.56–3.93)	3.40 (3.17–3.73)	0.003
Physical functioning	97.50 (85.00–100.00)	100.00 (95.00–100.00)	0.336
Physical role	100.00 (75.00–100.00)	100.00 (100.00–100.00)	0.220
Emotional role	100.00 (66.70–100.00)	100.00 (100.00–100.00)	0.015^c
Social functioning	75.00 (50.00–87.50)	75.00 (50.00–100.00)	0.404
Bodily pain	90.00 (63.13–100.00)	90.00 (67.50–100.00)	0.666
General health	72.50 (55.00–80.00)	85.00 (60.00–95.00)	0.031
	Mean ± SD	Mean ± SD	<i>p</i> ^b
Vitality	52.33 ± 18.60	67.90 ± 18.36	0.006
Mental health	54.67 ± 16.85	64.74 ± 19.45	0.061
Body mass index	22.81 ± 3.89	23.72 ± 5.08	0.482

Bold font indicates statistical significance.

^aEvaluated by Mann–Whitney *U*-test.

^bEvaluated by independent samples *t*-test.

^cMean rank of the non-PCOS group is significantly lower than that of PCOS group.

HOMA-IR, homeostasis model assessment of insulin resistance; PCOS, polycystic ovary syndrome; SD, standard deviation.

Results

A total of 49 hormone treatment-naïve trans men with a mean ± SD age of 27.22 ± 7.05 years who completed all the questionnaires were included in our study. Nineteen (38.8%) participants were diagnosed with PCOS, according to Rotterdam 2003 criteria. The mean ± SD BMI and HOMA-IR of all trans men were 23.17 ± 4.36 and 1.95 ± 1.76, respectively.

Age, BMI, and HOMA-IR did not significantly differ between PCOS and non-PCOS groups ($p=0.628$, $p=0.482$, and $p=0.783$, respectively) (Table 1). The scores of UGDS and BIS were significantly lower in the PCOS group compared with the non-PCOS group ($p<0.001$ and $p=0.003$, respectively). As described in detail in Table 1, among the eight parameters within SF-36, general health, emotional role, and vitality scores were significantly higher in the PCOS group ($p=0.031$, $p=0.015$, and $p=0.006$, respectively). The comparison of all the scores from the PCOS and non-PCOS groups are given in Figures 1 and 2.

Discussion

Our study is the first to demonstrate that GD is lower, whereas body image satisfaction and three of eight quality of life domains, that is, general health, emotional role, and vitality are higher in hormone treatment-naïve trans men with PCOS compared with those without PCOS.

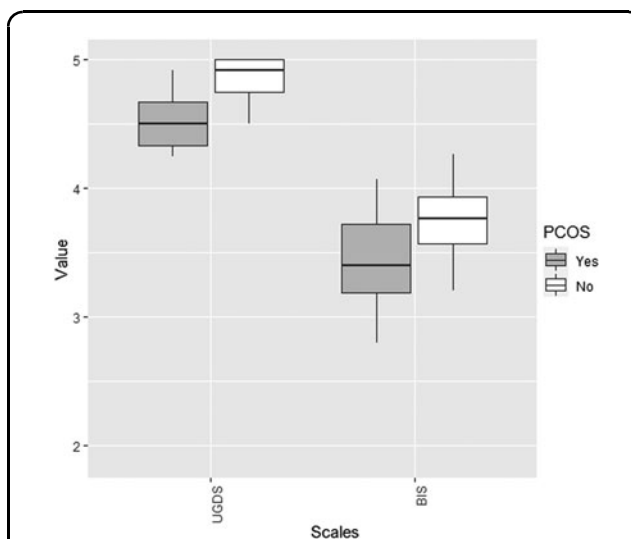


FIG. 1. The comparison of UGDS and BIS scores from PCOS and non-PCOS groups. The scores of UGDS and BIS were significantly lower in the PCOS group compared with the non-PCOS group ($p<0.001$ and $p=0.003$, respectively). BIS, Body Image Scale; PCOS, polycystic ovary syndrome; UGDS, Utrecht Gender Dysphoria Scale.

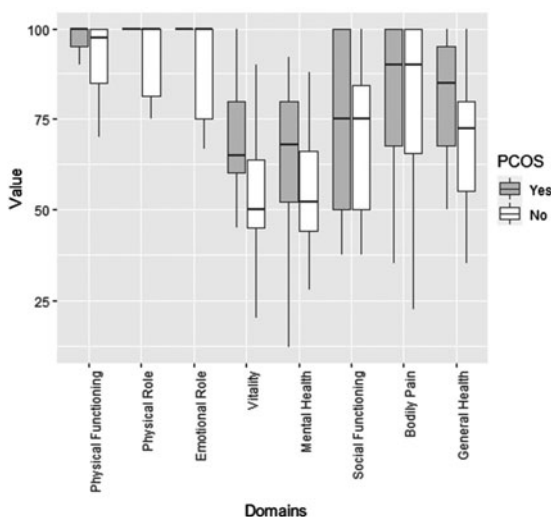


FIG. 2. The comparison of SF-36 domain scores from PCOS and non-PCOS groups. Among the eight parameters within SF-36, general health, emotional role, and vitality scores were significantly higher in the PCOS group ($p=0.031$, $p=0.015$, and $p=0.006$, respectively). SF-36, Short Form-36 Health Survey.

As the guidelines suggest, gender-affirming hormone therapy, which costs less than surgery, is generally the first-line treatment for individuals with GD because of its high efficacy in the development of secondary sex characteristics.³² In addition, Cohen-Kettenis and Van Goozen have reported that GD disappeared after sex reassignment surgeries in 22 adolescent transgender individuals.²³

A recent systematic review has demonstrated the positive effects of affirmative hormone therapy on the mood and the behavioral health of transgender people by decreasing anxiety, social stress, and improving the mental health-related quality of life.³³ In another comprehensive review, evaluating the data of 247 adults with GD from three prospective cohort studies, it has been stated that two studies showed a significant improvement in psychological functioning after initiating gender-affirming hormone treatment, whereas the third study demonstrated the improved quality of life after such hormone therapy.³⁴

Based on the Rotterdam 2003 criteria, the prevalence of PCOS in treatment-naïve trans men evaluated in this study was 38.8%. This is in line with the largest study conducted by Baba et al., investigating a total of 238 trans men

and finding a prevalence of PCOS in untreated 128 trans men of 32.0%.³⁵ Similarly, in a Spanish study reported in 2014, 35.4% of 77 trans men had PCOS.¹³

In a few smaller studies^{3,4,15,36} and a poster presentation,¹⁴ the prevalence of PCOS in trans men has been reported to vary more widely, between 14.4% and 91.7%, depending on the size of the study group. In addition to that, some early histological studies on both human³⁷ and animal models^{38,39} have demonstrated effects of androgens on ovarian follicular development, which may contribute to the higher prevalence of PCOS among trans men who are already on hormone treatment or with previous history of hormone treatment without any guidance by an endocrinology clinic. In contrast, Caanen et al. have suggested that long-term androgen therapy in trans men neither increases the prevalence of polycystic ovary US appearance, nor the diagnosis of PCOS.⁴⁰ This study would lend further support to the argument that PCOS phenotype occurs with a higher prevalence in treatment-naïve trans men than in the general cisgender female population.

PCOS is a disease presenting with oligo-amenorrhea and/or clinical/biochemical features of hyperandrogenism, which are physical characteristics generally desired by trans men.⁴¹ Therefore, the management of PCOS in trans men may be challenging, especially for those younger than 18 years of age who are dependent on their parents for the treatment decisions. The data in this study demonstrate that the clinical phenotype of PCOS improved the GD, body image dissatisfaction, and certain domains of quality of life in trans men. Consequently, it can be hypothesized that hormone therapies for PCOS that alleviate the clinical features of hyperandrogenism might worsen psychological functioning because of an increase in GD in trans men. It is therefore important to monitor the psychological functioning and the physical functioning of trans men who are undergoing treatment for PCOS.

As an interesting finding, BMI did not significantly differ between two groups in our study, in contrast to many reports discussing the association of obesity with PCOS in cisgender population.^{42,43} Unfortunately, there is no logical explanation for this outcome in the literature; however, it might be related to their body image dissatisfaction compared with cisgender population, which could lead an increase in the concordance of diet and physical activity in trans men population.

Considering the intersectionality between PCOS and GD is mandatory when assessing patients with PCOS

in clinical practice. It should not be assumed that a person wishes to remove the clinical symptoms of hyperandrogenism. Moreover, a sensitive questioning about whether they wish to reduce the symptoms of hyperandrogenism should be made before initiating the medical treatment. This evaluation is more essential in conservative countries like Turkey, where the cis-normative gender-binary view is dominant in the society. A trans individual is more often than not stigmatized and isolated, leading to the concealing of gender nonconforming feelings. Moreover, Turkish family structure attaches enormous social value to children and “owns” the sexuality of its unmarried daughters.⁴⁴ Therefore, the management of PCOS in trans men has always been challenging, not only for those younger than 18 years who are dependent on their parents for the treatment decisions, but also the young individuals older than 18 years who are still living with their families.

In this study, one of our aims was to categorize trans men with PCOS into four subgroups and compare the outcomes of three scales within the subgroups, to evaluate the impact of each phenotype on the outcomes. As the main limitation of this study, the statistical analysis could not be performed for the comparison of outcomes between these subgroups because of the relatively small number of participants in each subgroup (Phenotype A: 5/19, Phenotype B: 9/19, Phenotype C: 3/19, and Phenotype D: 2/19). Distribution of PCOS phenotypes has been reported in many studies all over the world and distribution of ratios has shown a variance between different studies.⁴⁵

In a study conducted by Tehrani et al., Phenotype B has been reported as the most prevalent subgroup in 1126 cisgender women with PCOS.⁴⁶ Despite the small number of subjects, Phenotype B was more prevalent than other three subgroups in our study. According to our hypothesis, Phenotypes A and B may play a more significant role than Phenotypes C and D, in terms of alleviating GD in trans men population with PCOS. Thus, this skewed distribution toward Phenotype B in our study might be a minor confounder to the survey outcomes. SF-36 is a quality-of-life measure that has been developed for the cisgender population, which might be regarded as another limitation of our study. Moreover, this study has been conducted during the COVID-19 pandemic, which could definitely affect the outcomes of the quality-of-life measure in both our groups. Although it was unfeasible to evaluate the physical and psychological effects of the pandemic on trans men, it might be a possible confounding factor

in this study. As two important factors that could alter the psychological outcomes of individuals, median ages and HOMA-IR for the two compared groups were not significantly different from each other ($p=0.628$ and $p=0.782$, respectively), which might be considered one of the strengths of our study.

Conclusion

In conclusion, this is the first study investigating the association of clinical and phenotypic features of PCOS with psychological parameters such as GD, body image dissatisfaction, and eight health-related quality-of-life domains in trans men. We have demonstrated significantly lower GD, higher body image satisfaction and quality of life in trans men with PCOS compared with those without PCOS. Our findings are promising for larger prospective cohort studies to develop a consensus on the management of PCOS in trans men.

Compliance with Ethical Standards

Ethics approval was obtained from the ethics committee of Kocaeli University, Faculty of Medicine (Date: November 13, 2019, No: KÜ GOKAEK 2019/19.34—2019/330) and written informed consent was acquired from each individual who participated in our study.

Author Disclosure Statement

No competing financial interests exist.

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References

1. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 5th ed., text revision. DSM-V-TR ed. Washington, DC, 2013.
2. Collin L, Reisner SL, Tangpricha V, Goodman M. Prevalence of transgender depends on the “Case” definition: a systematic review. *J Sex Med.* 2016; 13:613–626.
3. Baba T, Endo T, Honnma H, et al. Association between polycystic ovary syndrome and female-to-male transsexuality. *Hum Reprod.* 2007;22: 1011–1016.
4. Vujovic S, Popovic S, Sbutega-Milosevic G, et al. Transsexualism in Serbia: a twenty-year follow-up study. *J Sex Med.* 2009;6:1018–1023.
5. Foreman M, Hare L, York K, et al. Genetic link between gender dysphoria and sex hormone signaling. *J Clin Endocrinol Metab.* 2019;104:390–396.
6. The Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome (PCOS). *Hum Reprod.* 2004;19:41–47.
7. Carmina E, Azziz R. Diagnosis, phenotype, and prevalence of polycystic ovary syndrome. *Fertil Steril.* 2006;86:S7.
8. Bozdag G, Mumusoglu S, Zengin D, et al. The prevalence and phenotypic features of polycystic ovary syndrome: a systematic review and meta-analysis. *Hum Reprod.* 2016;31:2841–2855.
9. Knochenhauer ES, Key TJ, Kahsar-Miller M, et al. Prevalence of the polycystic ovary syndrome in unselected black and white women of the southeastern United States: a prospective study. *J Clin Endocrinol Metab.* 1998;83:3078–3082.

10. Futterweit W. Polycystic ovary syndrome: clinical perspectives and management. *Obstet Gynecol Surv.* 1999;54:403–413.
11. Deswal R, Narwal V, Dang A, Pundir CS. The prevalence of polycystic ovary syndrome: a brief systematic review. *J Hum Reprod Sci.* 2020;13:261–271.
12. Futterweit W, Weiss RA, Fagerstrom RM. Endocrine evaluation of forty female-to-male transsexuals: increased frequency of polycystic ovarian disease in female transsexualism. *Arch Sex Behav.* 1986;15:69–78.
13. Becerra-Fernández A, Pérez-López G, Menacho M, et al. Prevalence of hyperandrogenism and polycystic ovary syndrome in female to male transsexuals [in Turkish]. *Endocrinol Nutr.* 2014;1–8.
14. Calvar C, Fernandez M, Duran Y, et al. Polycystic Ovary Syndrome in Female to Male transsexual Persons. Vol. 41. BioScientifica, 2016. DOI: 10.1530/endoabs.41.EP682.
15. Bosinski HAG, Peter M, Bonatz G, et al. A higher rate of hyperandrogenic disorders in female-to-male transsexuals. *Psychoneuroendocrinology.* 1997;22:361–380.
16. Liu M, Murthi S, Poretsky L. Polycystic ovary syndrome and gender identity. *Yale J Biol Med.* 2020;93:529–537.
17. Azziz R, Kintziger K, Li R, et al. Recommendations for epidemiologic and phenotypic research in polycystic ovary syndrome: an androgen excess and PCOS society resource. *Hum Reprod.* 2019;34:2254–2265.
18. Bazarganipour F, Ziaei S, Montazeri A, et al. Body image satisfaction and self-esteem status among the patients with polycystic ovary syndrome. *Int J Reprod Biomed.* 2013;11:829–836.
19. Annagür BB, Tazegül A, Akbaba N. Body image, self-esteem and depressive symptomatology in women with polycystic ovary syndrome. *Arch Neuropsychiatry.* 2014;51:129–132.
20. Glowinska A, Duleba AJ, Zielona-Jenek M, et al. Disparate relationship of sexual satisfaction, self-esteem, anxiety, and depression with endocrine profiles of women with or without PCOS. *Reprod Sci.* 2020;27:432–442.
21. Colizzi M, Costa R, Todarello O. Transsexual patients' psychiatric comorbidity and positive effect of cross-sex hormonal treatment on mental health: results from a longitudinal study. *Psychoneuroendocrinology.* 2014;39:65–73.
22. Fisher AD, Castellini G, Ristori J, et al. Cross-sex hormone treatment and psychobiological changes in transsexual persons: two-year follow-up data. *J Clin Endocrinol Metab.* 2016;101:4260–4269.
23. Cohen-Kettenis PT, Van Goozen SHM. Sex reassignment of adolescent transsexuals: a follow-up study. *J Am Acad Child Adolesc Psychiatry.* 1997;36:263–271.
24. Lindgren TW, Pauly IB. A body image scale for evaluating transsexuals. *Arch Sex Behav.* 1975;4:639–656.
25. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (Sf-36): I. conceptual framework and item selection. *Med Care.* 1992;30:473–483.
26. Matthews DR, Hosker JP, Rudenski AS, et al. Homeostasis model assessment: insulin resistance and β -cell function from fasting plasma glucose and insulin concentrations in man. *Diabetologia.* 1985;28:412–419.
27. Azziz R, Dewailly D, Owerbach D. Clinical review 56: nonclassic adrenal hyperplasia: current concepts. *J Clin Endocrinol Metab.* 1994;78:810–815.
28. Escobar-Morreale HF, Carmina E, Dewailly D, et al. Epidemiology, diagnosis and management of hirsutism: a consensus statement by the androgen excess and polycystic ovary syndrome society. *Hum Reprod Update.* 2012;18:146–170.
29. Ferriman D, Gallwey JD. Clinical assessment of body hair growth in women. *J Clin Endocrinol Metab.* 1961;21:1440–1447.
30. Kocyiğit H, Aydemir Ö, Ölmez N, Memis A. Reliability and validity of the Turkish version of Short Form-36 (SF-36) [in Turkish]. *İlaç ve Tedavi Dergisi.* 1999;12:102–106.
31. Alioğlu F. Psychiatric Evaluation of Individuals with Gender Incongruence [Dissertation]. Kocaeli University Faculty of Medicine, Department of Psychiatry, Kocaeli University, Kocaeli, Turkey, 2020.
32. Coleman E. Standards of care for the health of transsexual, transgender, and gender-nonconforming people: an introduction. In: *Principles of Gender-Specific Medicine.* (Legato MJ; ed.). Cambridge, Massachusetts: Academic Press, 2017, pp. 69–75.
33. Nguyen HB, Chavez AM, Lipner E, et al. Gender-affirming hormone use in transgender individuals: impact on behavioral health and cognition. *Curr Psychiatry Rep.* 2018;20:1–9.
34. White Hughto JM, Reisner SL. A systematic review of the effects of hormone therapy on psychological functioning and quality of life in transgender individuals. *Transgend Health.* 2016;1:21–31.
35. Baba T, Endo T, Ikeda K, et al. Distinctive features of female-to-male transsexualism and prevalence of gender identity disorder in Japan. *J Sex Med.* 2011;8:1686–1693.
36. Mueller A, Gooren LJ, Naton-scho S, et al. Hyperandrogenemia in female-to-male transsexuals. *J Clin Endocrinol Metab.* 2008;93:1408–1411.
37. Spinder T, Spijkstra JJ, Van Den Tweel JG, et al. The effects of long term testosterone administration on pulsatile luteinizing hormone secretion and on ovarian histology in eugonadal female to male transsexual subjects. *J Clin Endocrinol Metab.* 1989;69:151–157.
38. Murray AA, Gosden RG, Allison V, Spears N. Effect of androgens on the development of mouse follicles growing in vitro. *J Reprod Fertil.* 1998;113:27–33.
39. Vendola KA, Zhou J, Adesanya OO, et al. Androgens stimulate early stages of follicular growth in the primate ovary. *J Clin Invest.* 1998;101:2622–2629.
40. Caanen MR, Schouten NE, Kuijper EAM, et al. Effects of long-term exogenous testosterone administration on ovarian morphology, determined by transvaginal (3D) ultrasound in female-to-male transsexuals. *Hum Reprod.* 2017;32:1457–1464.
41. Guss CE, Pitts S. Remember to ask about gender: management of polycystic ovary syndrome in transgender male adolescents. *J Pediatr Adolesc Gynecol.* 2018;31:182–183.
42. Glueck CJ, Goldenberg N. Characteristics of obesity in polycystic ovary syndrome: etiology, treatment, and genetics. *Metabolism.* 2019;92:108–120.
43. Naderpoor N, Shorakae S, Joham A, et al. Obesity and polycystic ovary syndrome. *Minerva Endocrinol.* 2015;40:37–51.
44. Polat A, Yuksel S, Discigil AG, Meteris H. Family attitudes toward transgendered people in Turkey: experience from a secular Islamic country. *Int J Psychiatry Med.* 2005;35:383–393.
45. Lizneva D, Suturina L, Walker W, et al. Criteria, prevalence, and phenotypes of polycystic ovary syndrome. *Fertil Steril.* 2016;106:6–15.
46. Tehrani FR, Simbar M, Tohidi M, et al. The prevalence of polycystic ovary syndrome in a community sample of Iranian population: Iranian PCOS prevalence study. *Reprod Biol Endocrinol.* 2011;9:39.

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Abbreviations Used

17-OHP = 17-hydroxyprogesterone
 BIS = Body Image Scale
 BMI = body mass index
 DSM-5 = Diagnostic and Statistical Manual of Mental Disorders, 5th Edition
 FPG = fasting plasma glucose
 FPI = fasting plasma insulin
 GD = gender dysphoria
 GIC = Gender Identity Clinic
 HOMA-IR = homeostasis model assessment of insulin resistance
 PCO = polycystic ovarian
 PCOS = polycystic ovary syndrome
 SD = standard deviation
 SF-36 = Short Form-36 Health Survey
 UGDS = Utrecht Gender Dysphoria Scale
 US = ultrasound